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Patent Application for: Automated Digital Voice Recorder to Personal Information Manager Synchronization

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1 **Automated Digital Voice Recorder to Personal Information Manager**

2 **Synchronization**

3

4 **TECHNICAL FIELD**

5 This invention relates generally to the field of digital voice recording.

6 Certain embodiments consistent with this invention relate to automated

7 conversion and transfer of voice messages between digital voice recorders

8 (DVRs) and integrated circuit (IC) recorders of audio signals, and personal

9 information manager (PIM) software applications on a personal computer (PC).

10

11 **BACKGROUND**

12 In the last few decades electronic voice recorders have been used to

13 capture thoughts and messages, summarize ideas, and document events across

14 a variety of business and personal applications. Storage and playback of audio

15 recordings has traditionally taken place on analog media or devices. More

16 recently, the use of digital media and devices has become possible. In recent

17 years the use of magneto-optical, solid state and Micro Drive digital storage

18 technologies has triggered growth in use of digital audio self-recorded content.

19 Accordingly, the number of Digital Voice Recorders (DVRs) has been growing in

20 the last few years. DVRs have provided various benefits over analog voice

21 recorders.

22 DVRs incorporate file-based content transfer capability. This capability

23 has been performed, for example, by USB connectivity or by compatibility with a

24 digital file removable storage media such as Memory Stick™ available also on

25 the PC, along with many other transfer mechanisms known to those skilled in the

26 art. In recent years, digital voice recording capabilities have been expanded from

27 dedicated voice recorders to other consumer electronic categories. These

28 categories have included digital music players with MP3 or ATRAC3 file playback

29 capabilities, Cellular phones or Personal Digital Assistants (PDA) devices with

1 built in or external microphone input, and digital imaging devices capable of
2 image, text, or video as well as audio recording. All of these and other devices
3 may be considered DVR devices for purpose of this document as long as they
4 can be adapted to download audio files recorded on the device to a computer
5 (PC), or upload content created on a PC to a DVR.

6 In recent years the PC has taken an important role as an entertainment
7 device in a large number of households, as well as a business tool in the home
8 and office. The PC has been used not only as a data depository and processing
9 center for information such as documents, spreadsheets and audiovisual content,
10 but also as a center for communications, scheduling and lifestyle management.
11 Handling contact, calendar, and task information on the PC has often been done
12 via software packages known as Personal Information Manager (PIM)
13 applications. PIM software packages have assisted in facilitating email
14 communications, time management, and responsibility tracking, to name a few.
15 In many cases these PIM applications have also served as a vehicle of
16 communication between a professional, such as a medical doctor, attorney, or a
17 business manager, and their administrator. This communication vehicle has been
18 provided via sharing access rights to schedule, tasks, and email between two
19 computers located in the same office or two computing devices using a computer
20 network such as a local area network or the Internet.

21

22 **OVERVIEW OF CERTAIN EMBODIMENTS**

23 The present invention relates generally to digital voice recording.
24 Objects, advantages and features of certain embodiments of the invention will
25 become apparent to those skilled in the art upon consideration of the following
26 detailed description of the invention.

27 In one embodiment consistent with the present invention an apparatus for
28 Automated Digital voice recorder to Personal information manager

1 Synchronization (ADPS) has an interface that receives at least one voice file
2 containing audio content and related information from a digital voice recorder
3 (DVR) and a memory. A processor is programmed to carry out reading
4 information in the voice file that associates audio content within the voice file with
5 a personal information manager (PIM) application and processing the voice file
6 by transferring the voice file to at least one PIM application.

7 In another embodiment consistent with the present invention an apparatus
8 for Automated Digital voice recorder to Personal information manager
9 Synchronization (ADPS) has an interface that enables file transfer to a Digital
10 Voice Recorder (DVR). A processor is programmed that transfers at least one
11 voice file containing audio content and related information from a Personal
12 Information Manager (PIM) application across the interface to the DVR.

13 In another embodiment consistent with the present invention an apparatus
14 for Automated Digital voice recorder to Personal information manager
15 Synchronization (ADPS) message creation has a microphone and an analog to
16 digital converter that converts analog microphone input signals to audio content
17 in a digital format, a memory, and a user interface. A processor is programmed
18 to receive an indication that an ADPS message is to be created, an ADPS type
19 selection relating the ADPS message to be created to a type of Personal
20 Information Manager (PIM) application, a start signal to begin recording audio
21 content for the ADPS message to be created, and a stop signal to stop recording
22 the audio content for the ADPS message to be created from the user interface.
23 The processor then creates an ADPS message by organizing the ADPS type
24 selection and the audio content into the ADPS message and storing the ADPS
25 message in the memory.

26 The above overviews are intended to illustrate exemplary embodiments of
27 the invention, which will be best understood in conjunction with the detailed

1 description to follow, and are not intended to define or limit the scope of the
2 appended claims.
3
4 **BRIEF DESCRIPTION OF THE DRAWINGS**
5 The features of the invention believed to be novel are set forth with
6 particularity in the appended claims. The invention itself however, both as to
7 organization and method of operation, together with objects and advantages
8 thereof, may be best understood by reference to the following detailed
9 description, which describes certain exemplary embodiments of the invention,
10 taken in conjunction with the accompanying drawings in which:
11 **FIGURE 1** is an Automatic DVR-to-PIM Download System (ADPS)
12 consistent with certain embodiments of the present invention.
13 **FIGURE 2** is an ADPS message creation flow diagram consistent with
14 certain embodiments of the present invention.
15 **FIGURE 3** is an internal DVR ADPS message creation flow diagram
16 consistent with certain embodiments of the present invention.
17 **FIGURE 4** is an ADPS message consistent with certain embodiments of
18 the present invention.
19 **FIGURE 5** is an ADPS message header consistent with certain
20 embodiments of the present invention.
21 **FIGURE 6** is an ADPS download process consistent with certain
22 embodiments of the present invention.
23 **FIGURE 7** is an ADPS download system block diagram consistent with
24 certain embodiments of the present invention.
25 **FIGURE 8** is another ADPS system consistent with certain embodiments
26 of the present invention.
27 **FIGURE 9** is another internal DVR ADPS message creation flow diagram
28 consistent with certain embodiments of the present invention.

1 **FIGURE 10** is an ADPS Upload process consistent with certain

2 embodiments of the present invention.

3 **FIGURE 11** is a block diagram of a DVR consistent with certain

4 embodiments of the present invention.

5 **FIGURE 12** is a block diagram of a computer consistent with certain

6 embodiments of the present invention.

7

8   **DETAILED DESCRIPTION**

9   While this invention is susceptible of embodiment in many different forms,

10 there is shown in the drawings and will herein be described in detail specific

11 embodiments, with the understanding that the present disclosure is to be

12 considered as an example of the principles of the invention and not intended to

13 limit the invention to the specific embodiments shown and described. In the

14 description below, like reference numerals are used to describe the same,

15 similar, or corresponding parts in the several views of the drawings.

16   The terms "a" or "an", as used herein, are defined as one or more than

17 one. The term "plurality", as used herein, is defined as two or more than two.

18 The term "another", as used herein, is defined as at least a second or more. The

19 terms "including" and/or "having", as used herein, are defined as comprising (i.e.,

20 open language). The term "coupled", as used herein, is defined as connected,

21 although not necessarily directly, and not necessarily mechanically. The term

22 "program", as used herein, is defined as a sequence of instructions designed for

23 execution on a computer system. A "program", or "computer program", may

24 include a subroutine, a function, a procedure, an object method, an object

25 implementation, in an executable application, an applet, a servlet, a source code,

26 an object code, a shared library / dynamic load library and/or other sequence of

27 instructions designed for execution on a computer system.

1   Audio information related to email communications, time management,

2   scheduling, address management, or responsibility tracking can be captured on a

3   DVR and transferred to a PC using the manual download capability provided by

4   some DVRs. A DVR capable of downloading an audio file to the PC is often

5   compatible with a software package that was designed specifically for it. In these

6   cases, an audio file created on the DVR is transferred to this DVR Dedicated

7   Software Application (DSA) on the PC via a manual file transfer over a USB

8   interface, or other transfer mechanism known to those skilled in the art. Once

9   the audio file is downloaded to the PC, the DSA may be used to manipulate the

10   file (listening, managing, sharing, etc.).

11   Unfortunately, the existing DVR-to-PC synchronization experience is

12   cumbersome, time consuming, and requires technical understanding of file

13   management and software. The process involves manual user interaction with

14   either the DSA or another application on the PC. These tasks may be a

15   challenge depending on file naming convention, number of files already in the

16   DSA, and simplicity of that application's user interface. Often this manual

17   interaction involves listening to individual files and their content in order to

18   remember what was recorded and for what purpose.

19   In many cases the user knows the intention in creating the audio

20   message, or alternatively, the nature of the recording, before the recording takes

21   place. However, without capturing their intention in recording that message at

22   time of creation, they may be forced to reestablish their thoughts later on during

23   file search on the PC. Further, a download of audio information recorded on a

24   device directly to a PIM function, or conversely, an upload of information from a

25   PIM function to a DVR, may be desired.

26   A mechanism, consistent with certain embodiments of the invention, to

27   enable capture of the PIM destination (the target PIM application) for the

28   recording, automatic download and processing of a message from the DVR

1　directly to the appropriate PIM function, and automatic upload and processing of

2　a message created in a PIM to a DVR is referred to in this document as the

3　Automatic DVR-to-PIM Synchronization system (ADPS).　An ADPS type

4　message is a combination of an audio recording (or message content) and the

5　information to allow processing of the message in the ADPS system.　One

6　exemplary ADPS enabled or activated device is a DVR that is capable of

7　recording an ADPS type message and transferring it to a computer or other

8　device, or a computer or other device that is capable of processing the ADPS

9　message.　This mechanism can generically be discussed as Automated Voice

10　File Processing (AVFP).

11　　　　As noted above, PIM applications include email, calendar and scheduling,

12　task lists (To Do List), time management, address management, responsibility

13　tracking, and many other applications designed to enhance a PC, or comparable

14　product, user's productivity and simplify their activities.

15　　　　Turning now to **FIGURE 1**, one embodiment of an ADPS system 100 is

16　shown.　DVR 104 is connected through an appropriate mechanism, such as a

17　USB connection 108 in this embodiment or by physical transfer of a removable

18　media such as a memory stick, to a PC or comparable device 112, to enable

19　download of an ADPS message 116 from an ADPS database 120 within DVR

20　104 to the PC 112.　It should be noted, and should now be evident to those

21　skilled in the art in view of this disclosure, that many other connection

22　mechanisms (eg. Ethernet, infrared, wireless, serial, parallel, IEEE 1394, or any

23　other suitable communication interface) can be used to connect the DVR 104 to

24　the PC 112.　Connection mechanisms, such as any standard or custom wireless

25　protocol, or any other effective communication mechanism can be used for

26　interconnection of DVR 104 to PC 112.　When the DVR 104 is connected to PC

27　112, the ADPS message 116 is automatically downloaded to the appropriate

28　target PIM application without a need to launch the DSA.　In certain

1 embodiments, there is no software launch required at all as will be discussed
2 below.

3 Turning now to **FIGURE 2**, an exemplary user ADPS message creation
4 flow diagram 200 is shown. This diagram starts at 204. At 208, the user
5 determines whether to create an ADPS message 116 or a standard audio
6 recording. If the user wants to create a standard audio recording, the user
7 presses the record button at 212, and then at 216, the user presses the stop
8 button to terminate the recording and the process ends at 220.

9 However, if the user wants to create an ADPS message 116 at 208, then
10 at 224, the user uses a control mechanism on the DVR 104, such as pressing a
11 MENU key, to initiate an ADPS message 116. At 228, the user uses a control
12 mechanism, such as pressing a DOWN button, on the DVR 104 to select the
13 ADPS message type (determines which PIM application is the target) to create
14 from a list that is available on the DVR 104. At 232, the user uses a control
15 mechanism on the DVR 104, such as manual entry of data in this embodiment, to
16 provide any information related to the ADPS message 116 later on PC 112.
17 Relevant information for the different ADPS messages defined in this
18 embodiment will be discussed below. After the user has fully or adequately
19 specified the information, if any, for the ADPS message 116, the user then
20 presses the record button at 212 to record the voice information. At 216, the
21 user presses the stop button to terminate the recording and the process ends at
22 220.

23 It should be noted that many other control mechanisms for identifying that
24 the user wishes to create an ADPS message are possible. Voice queues and
25 commands could be used through a voice recognition mechanism on the DVR
26 104 to initiate an ADPS message recording, to select the ADPS message type,
27 and to enter any relevant information for the ADPS message, as well as for
28 starting and stopping the recording process. Further, a touch screen and user

1   interface, independent of or along with the vocal queues discussed above, is

2   another possible solution. Those skilled in the art should now be able to

3   recognize a variety of possibilities for ADPS message indication, ADPS type, and

4   ADPS information entry and control of the apparatus in view of the present

5   disclosure.

6   As well, with regard to information related to ADPS messages, the

7   information can also be entered by recording an audio note. That audio note can

8   be later transcribed on the PC 112 or can be transcribed on the DVR 104 itself if

9   speech to text technology is incorporated into the DVR 104 firmware.

10   Turning now to **FIGURE 3**, an internal DVR ADPS message creation flow

11   diagram 300 is shown. The flow starts at 304. At 308, an indication that an

12   ADPS message is to be created is received from the user by any one of the

13   previously mentioned or other possible control mechanisms. At 312, the ADPS

14   message type selection and the computer target is received from the user. As

15   mentioned above, in this embodiment the ADPS message type is selected from a

16   list of possible ADPS message types that the user can choose from, and is also

17   chosen by any one of the previously mentioned or other possible mechanisms.

18   In the present embodiment, three different ADPS message types will be

19   considered for simplicity, but these three ADPS message types should not be

20   considered an exhaustive list of possible message types. The ADPS message

21   types in this embodiment are an email message, a schedule event, and a task for

22   a to-do list, but this should not be considered limiting. It should be noted that

23   many other ADPS message types are possible and are considered consistent

24   with this disclosure. The computer target selected at this stage could be an

25   indication of "business" or "personal" in a simplified embodiment. The simplified

26   selection of business or personal can, for example, allow a user to indicate to a

27   secretary that the secretary should download all business related emails for

28   processing while leaving the personal messages undisturbed on DVR 104. The

1 computer target selection can, for example, also be a selection from a list of

2 computers (eg. PCx, PCy, Laptop1, PC1, PC2) uploaded to DVR 104 with a

3 process discussed below. This uploaded list option allows the user to select the

4 specific computer that is a part of their network as the target computer. Other

5 options for the computer target will be apparent to those skilled in the art based

6 upon this disclosure.

7 At 316, the ADPS message type selection is evaluated to determine

8 whether an email message type was chosen. If so, an indication is

9 communicated to the user that the DVR 104 is ready to record an email message

10 at 320. This indication can be communicated by use of visual display, such as a

11 Liquid Crystal Display (LCD) message, an audible beep or other indication, a

12 previously recorded or digitally created verbal indication, or any of a variety of

13 other possible methods. At 324, an indication to start recording by any one of the

14 possible methods discussed above is received and the recording process begins

15 at 326. At 328, an indication to stop the recording by any one of the possible

16 methods discussed above is received and the recording process stops. The

17 internal DVR ADPS message creation flow 300 stops at 332.

18 If the ADPS message type selected by the user is not an email message

19 at 316, the selection is evaluated at 336 to determine whether a schedule event

20 was chosen. If so, other related information, for example, the date and time of

21 the scheduled event is received at 340, by any one of the possible methods

22 discussed above, and this information is stored along with the ADPS message

23 type as will be discussed later.

24 At 344, an indication is communicated to the user that the DVR 104 is

25 ready to record a schedule message. This communication to the user can be

26 accomplished by any of the methods discussed above in relation to an email

27 message recording or by any other appropriate method.

1   The internal DVR ADPS message creation flow 300 continues from 344 to
2   324 as discussed above for the email message recording where an indication to
3   start recording by any one of the possible methods discussed above is received
4   and the recording process begins. Subsequently, at 328 an indication to stop the
5   recording by any one of the possible methods discussed above is received and
6   the recording process stops. At 332, the internal DVR ADPS message creation
7   flow 300 ends.

8   If the ADPS message type selected by the user is not a schedule
9   message at 336, the selection is evaluated at 348 to determine whether a task
10   message was chosen. If so, other related information, such as the date and time
11   for the start of the task event is received at 352, by any one of the possible
12   methods discussed above, and this information is stored along with the ADPS
13   message type as will be discussed later. For task messages, an ending date and
14   time may be desired. If so, the date and time for the end of the task event is
15   received at 356, by any one of the possible methods discussed above, and this
16   information is stored along with the ADPS message type and start date and time
17   as will be discussed later. As well, a priority of the task may be specified. If so,
18   the priority of the task is received at 360, by any one of the possible methods
19   discussed above, and this information is stored along with the ADPS message
20   type, the start date and time, and the end date and time as will be discussed
21   later.

22   At 364, an indication is communicated to the user that the DVR 104 is
23   ready to record a task message. This communication to the user can be
24   accomplished by any of the methods discussed above in relation to email and
25   schedule message recording or by any other appropriate method.

26   The internal DVR ADPS message creation flow 300 continues from 364 to
27   324 as discussed above for email and schedule message recording and

1   subsequently to 328 and to 332 where the internal DVR ADPS message creation

2   flow 300 ends.

3   Turning now to **FIGURE 4**, one embodiment of an ADPS message 400 is

4   shown. In this embodiment, the data associated with the audio recording 404 is

5   digitally encoded as separate digital data that are concatenated to form the

6   ADPS message header 408 that is itself concatenated with the audio recording

7   404.

8   Turning now to **FIGURE 5**, one possible embodiment of an ADPS

9   message header 408 is shown. The message type is stored at 504. In this

10 embodiment, the message type represents either a standard audio recording or

11 an ADPS message 116. The message type 504 allows the PC 112 to properly

12 process the audio portion of the message. If the audio message is a standard

13 audio message (or any other non-ADPS message), then the PC application

14 knows not to do any processing on the file during transfer from the DVR 104, but

15 simply transfers the message to the appropriate destination as will be discussed

16 below in the PC application section. However, if the message type 504 indicates

17 that an ADPS message 116 was created, then the PC 112 can properly process

18 the audio portion of the message as will also be discussed below in the PC

19 application section.

20   As well, if an ADPS message 116 was created, then other fields of the

21 ADPS message header 408 are populated with data. At a minimum, the ADPS

22 type 508 is populated to indicate the destination PIM application for the ADPS

23 message 116. This ADPS type 508 can be any of the ones discussed above in

24 relation to **FIGURE 3**, or other types related to other PIM applications in other

25 embodiments.

26   As discussed above, if the ADPS message 116 is of an email type

27 message, then no other parameters may be relevant or helpful for the PC 112 to

28 properly process the ADPS message 116. In this case, parameter fields 512

1 through 520 may not be used. These fields can then either be excluded from the

2 header, thereby making the ADPS message header 408 dynamic in length, or

3 can be blank data fields or can be populated with other relevant parameters.

4 However, these fields can remain without inhibiting the processing of the ADPS

5 message at PC 112.

6   It should be noted that a dynamic or variable length for the ADPS

7 message header 408 may be used as long as the PC 112 and DVR 104 have a

8 common understanding of what parameters exist, and their placement within

9 ADPS message header 408, for each type of ADPS message 116. With this in

10 mind, it should now be apparent to those skilled in the art, upon consideration of

11 this teaching, that a header length parameter is not necessarily relevant

12 information, but this parameter may also be included in the ADPS message

13 header 408 without inhibiting the processing of the ADPS message 116 on PC

14 112. The method by which new ADPS message types are created and loaded

15 into the DVR 104 will be discussed below.

16   When the ADPS message 116 is either a schedule, task, or other

17 message type as may exist in other embodiments, then the parameter fields 512

18 through 520 are populated as appropriate for the specific ADPS type 508 with the

19 appropriate data retrieved from the user as discussed above in relation to

20 **FIGURE 3**.

21   Other options and possibilities exist for fields in the ADPS message

22 header 408. For example and without limitation, log information related to the

23 discussion below can be a part of the ADPS message header 408. Flagging log

24 information within ADPS message header 408 can be done in place of or in

25 conjunction with separate log creation on either the PC 112 or DVR 104.

26   It should also be noted, as discussed above in relation to **FIGURE 2**, that

27 the voice queues, commands, or audio notes, along with many other possible

28 mechanisms, could be used on the DVR 104 to initiate an ADPS message

1   recording, to select the ADPS message type, and to enter any information for the

2   ADPS message. In the case of captured voice commands or audio notes and

3   information, this information can be stored as part of the audio recording itself

4   thereby allowing the ADPS message header 408 to contain only the message

5   type 504.

6   Accordingly, an audio recording may be time stamped if the DVR

7   incorporates an internal clock. In this case, this time-stamp parameter may be

8   included in the ADPS message header 408 by many of the previously discussed

9   or possible alternate methods as should now be apparent to those skilled in the

10 art.

11   Turning now to **FIGURE 6**, an exemplary ADPS download process 600 is

12 shown. The process starts at 604. At 608, the ADPS download process 600

13 recognizes that a DVR 104 has been connected to PC 112. A Device Plugin that

14 is resident on PC 112 (as discussed below) controls access to DVR 104. It

15 should be noted that the term "Device Plugin" is used herein generically. Any

16 other interface that is capable of interfacing between the process and the

17 physical communication layer or communication protocol interface that is used to

18 interconnect the PC 112 and the DVR 104, as discussed above, can be

19 considered consistent with this disclosure and the use of the term Device Plugin.

20 At 612, priority access to the Device Plugin is gained through a request/grant

21 process. The priority access scheme is used to determine which of the possible

22 applications, such as the DSA, will connect to the DVR 104. When priority

23 access to the Device Plugin is granted, ADPS download process 600 determines

24 whether there are any ADPS messages 116 on DVR 104 that can be processed

25 at 616. If no messages on DVR 104 can be processed at 616, ADPS download

26 process 600 releases priority access to the Device Plugin at 620, and the

27 process ends at 624.

1   On the other hand, if there is at least one ADPS message 116 on DVR
2   104 that can be processed at 616, the process gets (receives) an ADPS
3   message 116 at 628. At 632, the ADPS type 508 is determined by reading
4   information that associates the voice content with a PIM application from the
5   ADPS message header 408. As discussed, the ADPS type 508 determines the
6   destination PIM application for the ADPS message 116. Additional parameter
7   fields 512 through 520, when appropriate for that message type, are included in
8   the ADPS message header 408.

9   Depending upon the PIM application, certain enhancements to the
10   recorded audio message can be done by use of enhancement filtering (e.g.,
11   transcription, enhanced audio, transcoding, or many other options as described
12   in more detail below). Based upon setup parameters in relation to the destination
13   PIM application, ADPS download process 600 can determine whether filter
14   enhancements are appropriate. If a determination that these filter enhancements
15   are appropriate is made at 636, the process transitions to 640 to process the
16   audio portion (voice/audio content) of ADPS message 116 through the relevant
17   enhancement filter(s) to create a post-enhancement audio portion, text portion, or
18   both. If no enhancement processing is appropriate at 636, or after enhancement
19   processing at 640, the process transitions to 644.

20   Depending upon the destination PIM application, the ADPS message 116
21   may be reformatted (or converted) to properly interface it with the destination PIM
22   application. If this reformatting is to be done, the ADPS message 116, with post-
23   enhancement audio portion (this could be a transcription, enhanced audio,
24   transcoding, or many other options as described in more detail below), may be
25   reformatted for the destination PIM, at 644. This reformatting can be a
26   conversion between a compressed and non-compressed formats, reorganization
27   of the message fields, or any other type of conversion that may be possible. For
28   example, and not by way of any limitation, a user may choose to store their email

1 in a space-economical format (e.g., MP3, LPAC, or other codec) for distribution

2 on the Internet, and may choose to store reminders in a non-space-economical

3 format (e.g., .wav format).

4   At 648, the reformatted and possibly enhanced ADPS message is then

5 sent (transferred) to a PIM through a PIM synchronization client. At 652, the

6 reformatted and possibly enhanced ADPS message is also copied to the DSA for

7 archival.

8   At 656, both transfers (to the PIM and DSA) are confirmed and if

9 confirmation is acknowledged, the ADPS message file 116 is deleted from the

10 DVR 104 at 660. A log entry is created at 662 to record the processing. As

11 discussed above, the log entry can be flagged in the ADPS message header 408

12 alone, or the log entry can be created on either PC 112 or DVR 104. At 664, the

13 process determines whether there are any more ADPS messages 116 on DVR

14 104 that can be processed. If there are more ADPS messages 116 on DVR 104

15 that can be processed, then a transition is made to 628 to process the next

16 message. If there are no more messages to process at 664, the process

17 transitions to 620 to releases priority access to the Device Plugin and then ends

18 at 624.

19   Turning now to **FIGURE 7**, ADPS download system block diagram 700 is

20 shown. ADPS download process 600 can be implemented within ADPS

21 download system 700. ADPS system 700 augments the standard DVR-to-DSA

22 download path 704 without destroying it. Using the standard DVR-to-DSA

23 download path 704, the message recorded on the DVR 104 can be downloaded

24 as a file via a DVR-to-PC connection, such as USB connection 108 in this

25 embodiment. The file can be transferred to the DSA 708 through a Device Plugin

26 712 (briefly discussed above). The Device Plugin 712 manages access of

27 software applications to the DVR 104 in order to transfer message data via the

28 physical communications layer (USB protocol in the present exemplary

1   embodiment). In order to handle recorded files, the user launches the DSA 708

2   and manages files as discussed above.

3   The File Processing Filter (FPF) module 716 uses ADPS path 720 to

4   communicate with DVR 104 and has priority over the DVR-to-DSA download

5   path 704 in accessing the Device Plugin 712. This allows the automated process

6   to work in an uninterrupted fashion relative to DSA 708.

7   The FPF 716 has several responsibilities. Some of them for this

8   embodiment may include without limitation: to activate/deactivate the ADPS

9   feature on DVR 104, to manage file transfer from DVR 104 through Device

10 Plugin 712, to process the file through the various file enhancement filters (to be

11 discussed below), to transfer the result of the file enhancement activity to the PIM

12 Synchronization Client (to be discussed below), to transfer the file to the DSA

13 708, to delete the file from DVR 104 after download and processing is complete,

14 to keep a log of processed files, and to grant Device Plugin 712 access to DSA

15 708 after the automated download is complete.

16   Activation and deactivation of the ADPS feature on DVR 104 is

17 accomplished by user interaction with FPF 716. The ADPS function may be

18 activated on DVR 104 by a software command from PC 112. Once DVR 104 is

19 connected to the PC 112, the FPF 716 will first verify that the DVR is ADPS

20 activated. If it is not ADPS activated, an automatic activation may take place.

21 Activation will enable the enhancements discussed above in DVR 104

22 functionality. These enhancements can enable entry of message content as well

23 as additional information that describes the message, as discussed above for

24 actions related to creating an ADPS message on the DVR. In some cases, the

25 DVR 104 ADPS functionality can also be deactivated. The user may specify a

26 request to activate or deactivate the DVR 104 ADPS functionality by interfacing

27 with the FPF 716 through a setup screen on PC 112 or DVR 104.

1   Management of the file transfer from DVR 104 through Device Plugin 712

2   can be automated in accordance with certain embodiments. The FPF 716

3   identifies if there are files to process upon DVR 104 to PC 112 connection. The

4   FPF 716 selects those files to be processed. These files can be transferred to

5   PC 112 via Device Plugin 712.

6   Configuration of ADPS download system 700 to process the file through

7   the various file enhancement filters can be accomplished through FPF 716

8   settings. The selected enhancements to the file may be of one, several, or none

9   of the processes available on PC 112. The selection may depend on the nature

10   of the recording allowing, for example, email type messages to be transcribed

11   and schedule event type messages to be acoustically enhanced and then

12   transcoded. The enhancing filters may be independent software modules

13   created by a separate manufacturer. These filters may be installed, launched,

14   and managed independently of the ADPS system 700 or the FPF 716

15   functionality. The recorded file is fed into these enhancing filters as an input,

16   either sequentially or in parallel, depending upon the configuration selected for

17   FPF 716. The order of processing can vary from that discussed below and such

18   a variation is considered consistent with the processing described.

19   Many possibilities exist for the file enhancement filters. For example, the

20   file enhancement filters could be a transcoder, an acoustic enhancer, a

21   transcriber, or any other file enhancement filter that becomes apparent to those

22   skilled in the art in view of this disclosure. The file enhancement filters can be

23   implemented using hardware or software operating on a general purpose

24   processor. The following order of processing can be configured during setup.

25   With transcoding filter 724, the file may be transcoded. Through the

26   transcoding filter 724, the file is transcoded to a specified codec and the resulting

27   file is then output from transcoding filter 724. The file could be transcoded to a

1   different bit rate, changed to Variable Bit Rate (VBR), changed to Fixed Bit Rate

2   (FBR), etc.

3   With acoustic enhancement filter 728, an acoustically enhanced file is the

4   output. This acoustic enhancement can include any of a variety of acoustic

5   enhancement measures, including but not limited to those commonly known to

6   those skilled in the art. For example, limiting, clipping, compressing, expanding,

7   notch filtering, band-pass filtering, low-pass filtering, high-pass filtering, noise

8   reduction, equalization, noise gating, and many other audio acoustic

9   enhancements can be performed.

10   With transcribing filter 732, the output may contain the audio file as well as

11   a text file representing the transcribed audio content, are the outputs. The audio

12   file may be discarded or redirected as discussed below. Transcribing can be

13   carried out using custom software, or commercially available products such as

14   "Dragon Naturally Speaking" available from ScanSoft, Inc.

15   A recorded message that was transferred is considered information. This

16   information is ultimately intended for a destination PIM application 736. This

17   routing is done in conjunction between FPF 716 and a PIM Synchronization

18   Client 740. Regarding the transfer of the result(s) of the file enhancement activity

19   to the PIM Synchronization Client 740, the FPF 716 communicates with the PIM

20   Synchronizing Client 740. The PIM Synchronizing client 740 is placing the

21   audio/text body of the message in the appropriate area of the PIM application

22   736. The PIM Synchronizing Client 740 may take the form of a separate

23   software component from the FPF 716 (but need not be a separate software

24   component) and may also be created by a different software manufacturer. The

25   PIM Synchronization Client 740 may be installed and setup independently of the

26   ADPS system 700 or the FPF 716 functionality. However, since there are PIM

27   Synchronization Client 740 and the FPF 716 functionality dependencies, there

28   may be advantages to using one setup procedure for both modules.

1   It should be noted that PIM application 736 is represented as one
2   component. This is for ease of presentation only. There may typically be many
3   PIM applications on a given PC 112. PIM functions can also be incorporated into
4   a plurality of user interfaces. Therefore, in any discussion about PIM application
5   736, the reader should keep the possible inherent plurality of PIM applications in
6   mind.

7   The user may decide to automatically download a file to the DSA 708
8   whenever an ADPS process 600 executes on ADPS system 700. The FPF 716
9   may download all files on DVR 104 to DSA 708. FPF 716 may also download
10   only those files that are processed for purpose of PIM management. In the last
11   case, the user may want to keep a backup of the file in DSA 708. As part of the
12   FPF 716 setup process, the user may specify automatic file to DSA 708
13   download.

14   After downloading, processing and directing a file to the appropriate PIM
15   application 736, the user may not desire to keep the recorded message on DVR
16   104. In that case, an automatic 'delete file on DVR' action takes place. Note that
17   the delete function is preceded by an acknowledgment that the message file has
18   been stored on the PC 112 hard drive. Only when the FPF 716 receives the
19   acknowledgment can the file be deleted from DVR 104.

20   The FPF 716 can keep a log of all files processed. When a message is
21   processed, it is flagged by the FPF 716. Thereby, the next time that DVR 104 is
22   connected to PC 112, the same file can be prevented from being processed
23   again. Therefore, a message recorded for purpose of an email message will only
24   appear in one email message in the email PIM application. Whenever, DVR 104
25   is connected to PC 112, FPF 716 can compare records of files on DVR 104 to
26   the log that has been previously created. If the file has no log record on that
27   computer, it can be downloaded and processed as a new file. FPF 716 can also
28   be able to identify files modified on DVR 104, even if these files were

1 downloaded before the modification. In that case, FPF 716 can either download

2 or not download the file depending on preference settings specified during the

3 setup procedure for FPF 716. Further, as a configuration option for FPF 716, the

4 files on DVR 104 can default to either allow them to be synchronized to multiple

5 computers or a single computer.

6   One exemplary way to manage the log is by storing the log file on PC 112.

7 Another is to store the log file on DVR 104. If stored on DVR 104, the log file can

8 record transactions to multiple computers (Personal, Business, PCx, PCy). An

9 alternative way to track a processed file is to add a 'downloaded' flag

10 corresponding to processed files on DVR 104. Files that were downloaded using

11 FPF 716 can be flagged as 'downloaded,' whereas files that were not

12 downloaded can have their 'downloaded' flag unaltered. When the 'downloaded'

13 flag is set, there is no downloading of the file the next time that DVR 104 is

14 connected to a specified PC such as PC 112. The 'downloaded' flag may be one

15 of the file's attributes and can be changed on DVR 104 by an action taken on PC

16 112. FPF 716 can then identify which files are to be processed and which ones

17 are not based on that flag information. When a file that was newly created on

18 DVR 104 is automatically downloaded to PC 112, FPF 716 changes the flag

19 information of that file to 'downloaded'. When the user selects an option not to

20 delete a file on DVR 104 after processing and thereby allow later file modification

21 or copying to another PC, another option that can be set by the user is for the

22 'downloaded' flag to be cleared when an existing file is later modified on DVR

23 104, or for the 'downloaded' flag not to be set when copied which allows copying

24 to another PC. This will allow the user to determine whether to reprocess a file if

25 it is modified on DVR 104 or to process the file if it is to be downloaded to

26 another PC.

27   The ADPS process 600 executing on ADPS System 700 only takes place

28 once the DVR is connected to PC 112 via USB 108, or when removable media

1 such as a memory stick that contains ADPS files is inserted into PC 112. Once

2 FPF 716 is done with all its activities, the automated process is over. At that

3 point, the user may launch and use DSA 708 software to manage recorded files

4 on PC 112 or on DVR 104. In order to enable DSA 708 to access DVR 104

5 through Device Plugin 712, FPF 716 gives up its priority for access to Device

6 Plugin 712. FPF 716 gives up the device access until the next time that USB 108

7 recognizes a DVR getting connected to PC 112.

8 In order to enable the FPF 716 priority access to Device Plugin 712,

9 Device Plugin 712 can be designed to allow device access by multiple modules.

10 Device Plugin 712 can then prioritize FPF 716 access when first detecting a

11 connected DVR 104. Once FPF 716 relinquishes access to Device Plugin 712,

12 DSA 708 can have access to DVR 104 until the next time that a new DVR

13 connection is detected. The new device connection and detection process takes

14 place in cases such as when a USB cable is connected to PC 112 or when a PC

15 112 is starting up when a USB cable is already connected.

16 Setup procedures for the above-mentioned ADPS process 600 and ADPS

17 system 700 can now be discussed. Additional possibilities exist for FPF 716 to

18 activate DVR 104 and automate the ADPS process 600. A setup procedure can

19 be run on PC 112 that sets up the interface preferences for ADPS process 600

20 and ADPS system 700. A DVR 104 capable of downloading audio files to a PC

21 112 interacts with a DSA that allows management of these files. This

22 functionality can be done after the installation and activation of the DSA 708.

23 However, no special activation is required on the DVR side when the download

24 functionality is built into the DVR 104 firmware, though an activation mechanism

25 may be used to allow for the ADPS feature set to be enabled upon purchase of

26 the feature set. DVR 104 may have two different patterns of behavior: *Regular*

27 *Behavior* is capable of use for downloading an audio file from the DVR 104 to the

28 DSA 708, and *PIM-related Behavior* is available when an indication of an ADPS

1 type message is made. In the *PIM-related Behavior* mode, the downloaded file is

2 being processed and directed to the appropriate PIM function. The *PIM-related*

3 *behavior* capability may be activated through an ADPS activation in order to

4 enable a change of DVR 104 behavior. In that case DVR 104 can be connected

5 to the PC 112 and software running on the PC 112 will activate this special

6 function on DVR 104. This software activation of a device behavior is similar to

7 closing a power switch on an electric system. When the switch is turned off PIM-

8 related functionality is not available. When the switch is turned on, the system is

9 capable of operating in *Regular* as well as *PIM-related Behavior* mode.

10   In addition to activating ADPS device functionality, the setup of functions

11 on PC 112 to enable automatic processing of the audio content once it is

12 downloaded to the PC 112 can also be done.

13   In order to enable automatic processing of the audio content once it is

14 downloaded to PC 112, several settings are possible for the setup of the FPF

15 716. Some of them are automatic transcription, automatic transcoding, removing

16 or retaining the file on DVR 104 after processing, and downloading of the file to

17 the DSA for archival.

18   Automatic Transcription allows an automatic transcription process such as

19 running a speech to text application. The user may want to use the transcription

20 function in conjunction with the file download (e.g., Transcribe a file and also filter

21 the file). The function may be associated with all PIM functions or with a specific

22 PIM function. So, for example, a message recorded to be an email

23 communication may be transcribed into the email message in the PIM whereas a

24 schedule event may be transferred to the PIM without automatic transcription. In

25 addition, after the file is transcribed, the user may not wish to send the audio file

26 itself. In that case, the user may want to edit a text message without dealing with

27 the audio file embedded in that PIM's function. After the editing is done, the user

28 can send text only email communication based on the transcribed audio file. The

1 setup process enables the user to choose their preferred handling of the audio
2 and the transcribed files.

3 Automatic transcoding allows transforming a file recorded in one codec
4 scheme to another as discussed above. Transcoding may be desired for many
5 purposes such as further compression or use with more ubiquitous formats such
6 as .wav or .mp3. Since native playback and recording of audio content may vary
7 from one DVR model to another, transcoding may provide consistency with other
8 audio content synchronized from a DVR or recorded on the PC 112 as well as for
9 content that may need to be uploaded from the PC to another DVR. Native
10 transcoding may be selected for some PIM message types but not others in
11 certain embodiments.

12 Removing or retaining a file on the DVR after download is another
13 possible option. A user may want to retain a copy of the file on the DVR even
14 after download. In those cases, they may not want to remove the message from
15 the DVR after download. Removing the message after download creates space
16 on the DVR for additional audio recordings. During the setup process the user
17 may select their preferences for automatic or manual removal of files from DVR
18 104.

19 Download the file to the DSA is another possible setup option. Users may
20 want to download a copy of a file from the DVR to the DSA. The DSA could be
21 used as a backup for files that are removed from the DVR and placed in the PIM.
22 The advantage of downloading to the DSA in addition to PIM download may be
23 having a backup of audio files in the one application that handles all recorded
24 files (the DSA). In addition, the automatic download of all files to the DSA, may
25 remove the action of separately specifying the download within the DSA
26 interface. The user may be given an option to select their preferences for DSA
27 file download.

1   A folder structure may assist in backup and management of files in the

2   DSA. For example and not by way of limitation, all email ADPS messages can

3   be stored in a dedicated folder, while schedule ADPS messages and regular

4   recordings can be stored in different folders.

5   When enabling functionality on DVR 104 and setting up the download

6   system on the PC are completed the system is ready for recording and

7   automatically downloading ADPS type messages. The recorded file may

8   automatically be downloaded and managed. An indication, such as an icon on

9   the PC 112 Desktop Task Manager, may be an acknowledgment that the FPF

10   716 is active. In this way, a user that does not want the FPF 716 to be resident

11   could close the FPF 716 anytime they wish. Disabling the FPF 716 immediately

12   makes the Device Plugin 712 accessible by the DSA 708. Settings can be

13   changed at any time by recalling the FPF 716 setup prompts on PC 112.

14   In view of the present teaching, one skilled in the art should now be able

15   to recognize that many other possibilities exist for setup and configuration of the

16   DVR and PC environments, and all are considered within the scope of the

17   disclosure.

18   Turning now to **FIGURE 8**, a second embodiment of an ADPS system 800

19   is shown. DVR 104 is connected through an appropriate mechanism, such as a

20   USB connection 108 in this embodiment, to a PC or comparable device 112, to

21   enable download of an ADPS message 116 from ADPS database 120, to the PC

22   112. As previously noted, other connection mechanisms can be used to connect

23   the DVR 104 to the PC 112. Connection mechanisms, such as any standard or

24   custom   wireless   protocol,   removable   media   (e.g.,   FLASH,   CD-R,

25   SMARTMEDIA™ CD-RW, HDD, magnetic discs, or MiniDisc), or any other

26   effective communication mechanism can be used for interconnection of DVR 104

27   to PC 112. When the DVR 104 is connected to PC 112, the ADPS message 116

28   may be automatically downloaded to the appropriate target PIM application

1   without launching the DSA.   USB connection 108, or any other effective

2   connection, can also be used to upload settings and data 804 from PC 112 to

3   DVR 104. This upload capability allows a user to create new and custom ADPS

4   message formats. These new and custom message formats may include the

5   new ADPS type and parameter sets. This feature allows the adaptation of the

6   ADPS system 800 to other PIM applications as they become available, as well as

7   reconfiguration and augmentation of the existing user interface on DVR 104.

8   Turning now to **FIGURE 9**, a modified internal DVR ADPS message

9   creation flow diagram 300 is shown as internal DVR ADPS message creation

10 flow diagram 900. This modified version of DVR ADPS message creation flow

11 diagram 300 shows two of the many possible modifications a user can achieve

12 with the user of the upload capability of ADPS system 800.

13   First, one can notice by inspection of the two figures that the order of the

14 list of ADPS message types presented to the user can be altered. In **FIGURE 9**,

15 the columns of activity related to the ADPS message type selected by the user

16 are swapped in the list. Therefore, the schedule ADPS message evaluation 336

17 and the presentation of that message creation option to the user are before the

18 task ADPS message evaluation 348 and presentation of that message creation

19 option to the user. This list ordering can represent the order of items in the

20 ADPS message type list as modified by the user and can alter both the internal

21 processing of a message selection and the order of operations that are available

22 for the user.

23   The second modification in this embodiment is that a list of addressees for

24 email messages has been uploaded to DVR 104 and presented to the user at

25 904. At 908, the user's selection for the addressee of the email ADPS message

26 is received and the processing continues with the addressee information

27 becoming a new parameter in the ADPS header. As such, the user can modify

28 the ADPS message header and message format, the information available to the

1 user during an ADPS message interaction session, and the behavior of the DVR

2 104 during an ADPS message interaction session.

3 Thus, a computer data signal embodied in a bit stream can be

4 communicated between a Digital Voice Recorder (DVR) and a host computer

5 with a segment of data representing a digital voice message and a header

6 containing information that defines an association between the digital voice

7 message and a personal information manager (PIM).

8 It should now be apparent upon consideration of this teaching to those

9 skilled in the art that many other modifications to the DVR 104 environment are

10 possible with the upload capability of ADPS system 800, such as adding a new

11 message type, audio contact information, complex records, and other custom

12 records.

13 Turning now to **FIGURE 10**, the process described above for automatic

14 download may be modified to create an Automatic PIM-to-DVR Synchronization

15 (ADPS) Upload process 1000 as shown. A user may desire to take files that

16 have been created or stored on PC 112 with them on DVR 104 when they leave

17 home or the office. The user may configure ADPS upload process 1000 in a

18 variety of ways (eg. to transfer all email messages with audio content, all events,

19 files of a certain date or time). The process starts at 1004. At 1008, the ADPS

20 Upload process 1000 recognizes that a DVR 104 has been connected to PC 112.

21 A Device Plugin that is resident on PC 112 controls access to DVR 104. At

22 1012, priority access to the Device Plugin is gained through a request/grant

23 process.

24 When priority access to the Device Plugin is granted, ADPS download

25 process 600, described above, executes at 1014 with a pass-through effect for

26 blocks 612 and 620 related to Device Plugin access. When ADPS download

27 process 600 completes, ADPS Upload process 1000 determines at 1016 whether

28 a message in a source PIM is already validly formatted for DVR 104. All

1 candidate files should comply with the audio Codec enabled on the DVR 104

2 when eventually downloaded. Files not complying may be transcoded to the

3 appropriate codec. Files containing text may be handed over to a text to speech

4 filter. As such, files may be transcoded or processed through a text to speech

5 filter in order to be validly formatted for DVR 104. Based upon this teaching, it

6 should now be apparent to those skilled in the art, that many other filters and

7 conversions can be possible. These other possible filters are contemplated and

8 considered consistent with this disclosure. Therefore, if the message for DVR

9 104 is not validly formatted at 1016, the file is processed through the appropriate

10 filter(s) at 1020, as discussed above. The file is formatted properly for DVR 104

11 at 1024.

12   Memory space on DVR 104 is another consideration. One action that can

13 be taken in case of limited DVR space can be an automatic transcoding of files to

14 a lower bit-rate before upload. The transcode to a lower bit-rate process may

15 also take place anytime that a file is uploaded from the' PIM to the DVR 104. In

16 case that the message contains text as well as audio information further

17 processing may take place. For example, an email message containing audio

18 and text information may be text-to-speech processed for the text portion, and

19 then appended into one message file along with the audio recording. As another

20 example, if space on DVR 104 is limited, a setup selection of upload by

21 predetermined priority or exclusion of files larger than preset size may take place.

22 An interface can include an indication to the user that the upload may not take

23 place because of DVR 104 memory limitation.

24   At 1028 the space on DVR 104 is validated to determine if there is

25 sufficient space for the file to be uploaded. If there is not sufficient space

26 determined at 1028, the process determines whether the file can be transcoded

27 to a lower bit rate to fit the available space at 1032. A minimal bit-rate for

28 transcoding can be configured.

1   If it is determined that the file cannot be transcoded to fit the available
2   space in DVR 104 at 1032, a notification is presented to the user at 1034
3   indicating that the file could not be transferred and the process releases priority
4   access to the Device Plugin at 1036, and the process ends at 1040. If it is
5   determined that the file can be transcoded to fit the available space in DVR 104,
6   then the process transitions to 1020 to process the file. A formatting, as
7   discussed above, is done at 1024, and the space is again validated at 1028.

8   In either case, if there is sufficient space determined at 1028 (either
9   initially or after a transcoding), the file is copied to DVR 104 at 1044. The file is
10   also copied to the DSA at 1048. Both file transfers are confirmed and
11   acknowledged at 1052 and the file can be deleted from the PIM application at
12   1056 depending upon configuration. A log of the processing can be created at
13   1058, also depending upon configuration.

14   At 1060, the process determines whether there are any more messages in
15   a PIM application that can be processed. If there are more messages in a PIM
16   application to process, then a transition is made to 1016 to process the next
17   message. If there are no more messages to process at 1060, the process
18   transitions to 1036 to releases priority access to the Device Plugin and then ends
19   at 1040.

20   Thus, the DVR 104 may be used for, in addition to downloading recorded
21   ADPS messages 116 and standard audio recording, uploading PIM messages,
22   uploading standard audio files, and uploading other audio information.

23   It may be desirable to distinguish between those messages uploaded from
24   the PIM and other message types. In order to distinguish between these
25   messages, the device may incorporate a graphical indication associated with files
26   uploaded from the PIM. The special characteristics of files uploaded from the
27   PIM may assist in playback selection. For example, email files associated with a
28   certain email addressee may be played back sequentially upon selecting the

1 addressee name on the DVR. Schedule files may prompt the user to play back
2 according to message timing or may play back automatically when there is a
3 date/time match with the DVR clock. To-do messages may be sorted and played
4 back based on priority or completion date/time.

5   Automatic DVR to PIM download could take place in various other
6 systems. Some commercially available PIM Synchronization Client software
7 applications are able to connect to Web-based PIM. This allows such Web-
8 based PIM to be accessed from any computer upon entering a user name and/or
9 password. A Web-based PIM may store information on a remote server. Data
10 access and management can usually be done via an Internet browser interface.
11 Enabling compatibility with a Web-based PIM may employ a modified
12 architecture for the FPF as well as a different type of PIM Synchronization Client
13 to accommodate for data storage on a remote server.

14   The FPF can accommodate the possibility that a connection with the web
15 based PIM is not established immediately. Most tasks of the FPF can still take
16 place. However, since an immediate download of content and acknowledgment
17 from the PIM Synchronization Client may not be available, a delayed activity may
18 take place. Action such as removing a message from the DVR or flagging a file
19 already downloaded to the PC may be postponed. A message that was not
20 downloaded because of inability to access a remote server may be stored locally
21 on a PC for a later download. Once the download takes place an
22 acknowledgement can be sent by the PIM Synchronization Client to the FPF.

23   Some components of the PIM Synchronization Client may reside on the
24 remote server. These components place the message in the appropriate storage
25 place in the server. However, the components that directly communicate with the
26 FPF have to reside on the PC where the FPF resides.

27   Further, in some cases it may be desired to download content to the PIM
28 appropriate function without connecting to a PC at all. In those cases the PIM

1   itself may still be accessible via a PC and may be interfaced either via a PIM
2   software client or a Web-based interface. Similar to a Web-based PIM case, the
3   design of the system can be adapted or modified in order to accommodate for
4   delays and issues related to communication from the DVR to the PIM.

5   Turning now to **FIGURE 11**, an exemplary block diagram of a DVR 1100
6   capable of implementing the DVR-side ADPS methods discussed above is
7   shown. DVR 1100 has a central processor unit (CPU) 1104 with an associated
8   bus 1108 used to connect the central processor unit 1104 to Random Access
9   Memory 1112 and/or Non-Volatile Memory 1116 in a known manner. An output
10   mechanism at 1120 may be provided in order to connect to a computer of an
11   APDS system. It should be noted that, in addition, DVR 1100 may incorporate a
12   mechanism to directly communicate with a computer network such as the
13   Internet, or a local or wide area network, without the need to connect directly to a
14   computer. The communication can take place using a wired or wireless method.
15   In these cases the DVR can download messages by use of a built in or external
16   modem. External connection may be implemented by any connection device
17   such as dedicated external modem, PDA with a built in modem, and a Cellular
18   Phone with voice and data capabilities, along with many other methods. In all
19   these cases, the system can maintain its functionality and may incorporate some
20   of the remote functions such as those described above related to a Web-based
21   PIM. In this type of implementation the FPF can reside on a remote computer or
22   server. The DVR can be modified to enable communication with the remote
23   FPF. Similarly, input devices such as a microphone and input select devices, or
24   USB input 1124 may be provided for the input of information by the DVR 1100
25   user or from a personal computer. Further, a voice recognition capability can be
26   added, as discussed above, in either a hardware or software embodiment, to
27   enable voice command interpretation and recognition as a part of the input 1124
28   for use in a user interface of DVR 1100.

1   Turning now to **FIGURE 12**, an exemplary block diagram of a computer
2   system 1200 capable of implementing the PC-side ADPS methods discussed
3   above is shown.   Computer system 1200 has a central processor unit (CPU)
4   1210 with an associated bus 1215 used to connect the central processor unit
5   1210 to Random Access Memory 1220 and/or Non-Volatile Memory 1230 in a
6   known manner.   Computer system 1200 can perform such functions as
7   controlling the ADPS processes described above, PIM application(s), file
8   transfer, file enhancement filtering, formatting, logging, and other functions
9   discussed above and contemplated by the above discussion.   An output
10   mechanism at 1240 may be provided in order to display and/or print output for
11   the computer user and to interface to the DVR for ADPS synchronization by any
12   of the methods discussed above. Similarly, input devices such as keyboard and
13   mouse 1250 may be provided for the input of information by the computer user.
14   Computer 1200 also may have disc storage 1260 for storing large amounts of
15   information including, but not limited to, program files and data files.   Computer
16   system 1200 may be coupled to a local area network (LAN) and/or wide area
17   network (WAN) and/or the Internet using a network connection 1270 such as an
18   Ethernet adapter coupling computer system 1200, possibly through a firewall.

19   Those skilled in the art will recognize that certain of the exemplary
20   embodiments described herein are based upon use of a programmed processor.
21   However, the invention should not be so limited, since certain embodiments
22   could be implemented using hardware component equivalents such as special
23   purpose hardware and/or dedicated processors which are equivalents to the
24   invention as described and claimed.   Similarly, general purpose computers,
25   microprocessor based computers, micro-controllers, optical computers, analog
26   computers, dedicated processors and/or dedicated hard wired logic may be used
27   to construct alternative equivalent embodiments of the present invention.

1   Those skilled in the art will appreciate that the program actions and

2 associated data used to implement the embodiments described above can be

3 implemented using disc storage as well as other forms of storage such as for

4 example Read Only Memory (ROM) devices, Random Access Memory (RAM)

5 devices; optical storage elements, magnetic storage elements, magneto-optical

6 storage elements, flash memory, core memory and/or other equivalent storage

7 technologies without departing from the present invention. Such alternative

8 storage devices should be considered equivalents.

9   Certain embodiments as described herein, can be implemented using a

10 programmed processor executing programming instructions that are broadly

11 described above in flow chart form that can be stored on any suitable electronic

12 storage medium or transmitted over any suitable electronic communication

13 medium. However, those skilled in the art will appreciate that the processes

14 described above can be implemented in any number of variations and in many

15 suitable programming languages without departing from the present invention.

16 For example, the order of certain operations carried out can often be varied,

17 additional operations can be added or operations can be deleted without

18 departing from the invention. Error trapping can be added and/or enhanced and

19 variations can be made in user interface and information presentation without

20 departing from the present invention. Such variations are contemplated and

21 considered equivalent.

22   While the invention has been described in conjunction with specific

23 embodiments, it is evident that many alternatives, modifications, permutations

24 and variations will become apparent to those skilled in the art in light of the

25 foregoing description. Accordingly, it is intended that the present invention

26 embrace all such alternatives, modifications and variations as fall within the

27 scope of the appended claims.

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1   What is claimed is:

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